PERMITTEE: El Paso Natural Gas Company **DATE: 07/24/97**

TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT NO. 1000159

REMARKS

REMARK NUMBER	REMARKS	REVWD BY
1.	This application is submitted for renewal of existing operating permit #75010 for El Paso's Wenden Compressor Station.	RK2
2.	The facility is located 33 miles west of Tonopah, Arizona, La Paz County. ADEQ has jurisdiction over this source.	
3.	El Paso operates one regenerative cycle gas turbine and one simple cycle turbine (both natural gas fired) for natural gas transmission. The simple cycle turbine, installed in 1992 has been retrofitted to include SoLoNox technology that reduces NOX emissions as per ADEQ request. No control equipments are used to control emissions from burning natural gas for the regenerative gas turbine.	
4.	An installation permit (#75010) was issued on November 2, 1990.	
5.	The GE turbine was installed in April 1969, and the Solar Centaur turbine was installed January 1991. The Solar Centaur turbine was retrofitted to include the SoLoNox process on April 1994.	
6.	The Installation permit #75010 called for performance tests of the GE Frame 3 to be tested within 180 days of issuance of permit, and the Solar Centaur was required to be tested triennially. Because of these requirements, several performance tests have been conducted on the Wenden Station in the last five years. For further information, please see Field Activity Reports (FAR) #14891, 15055, 16993, 10658, and 10893.	
7.	Three NOVs have been issued to this source. Please see the attached explanation.	

Explanation of NOVs

Violation No. 1 was issued on February 21, 1992. The measured CO emission rate from the Solar Centaur turbine was greater than the limit specified in Installation Permit #75010.

Violation No. 2 was issued on February 21, 1992. The measured NOX emission rate from the GE Frame 3 turbine was greater than the limit specified in Installation Permit #75010.

Violation No. 3 was issued on Feb 25, 1992. After, performance tests were conducted and emissions were calculated, ADEQ determined that the NOX emissions from the GE Frame 3 were 283 tpy. Also, the performance test showed that the Solar Centaur turbine emitted over 40 tons per year of Nox. Therefore, the addition of the Solar Centaur that was allowed by the Installation permit issued August 31, 1990 should have been issued as a modification to a major source, thus requiring PSD review. ADEQ then issued an NOV citing that major source permitting rules were not followed. Because El Paso Natural Gas (EPNG) submitted PTE calculations based on AP-42 factors which were the best factors available at the time, ADEQ eventually closed the NOV in 1994.

The outcome of the NOV was to require SOLONOX liners to be installed to the Solar Centaur turbine. This was done in April of 1994. In 1994, EPNG decided that the Wenden station would add two Solar Taurus turbines. The addition of the two Solar Taurus constituted a major modification and thus required PSD review. The PSD application was processed from 1994 to June 1997. In June 1997, EPNG decided that the addition of the two Solar Taurus turbines is no longer necessary. Therefore, EPNG has withdrawn the PSD application.

TECHNICAL REVIEW OF PERMIT NUMBER 1000159
(El Paso Natural Gas Company, Wenden Compressor Station)

General Comments

El Paso Natural Gas Company (EPNG) provides natural gas transportation services for natural gas suppliers and end users throughout the southwestern United States. EPNG owns and operates a large pipeline network for which the Wenden Compressor Station serves as one of the gas compression locations. Compression is needed to maintain enough pressure in the pipeline to keep the gas flowing through the pipeline network, and is accomplished by two natural gas fired turbines that drive the compressor units. Although Wenden Station has been automated, the location is attended.

The Wenden station operates two gas turbines to drive the compression units. One of the gas turbines is a GE regenerative cycle gas turbine and one is a Solar Centaur simple cycle gas turbine. The gas turbines are powered by the combustion of natural gas. The gas turbine stacks are the primary sources of air pollutant emissions. The primary pollutant present in the stack gases resulting from combustion of natural gas is NOx. Formaldehyde, SO_2, CO, and VOCs are other trace pollutants present in the stack gases. Other equipment on site is comprised mainly of valves, compressor seals, connections and associated piping, and emissions from these units are mainly trace amounts of VOCs.

Regulatory History

Though the GE Frame 3 turbine of the Wenden station has been operating for a few decades, the first and only air quality permit was an installation permit issued to them on 8/31/1990. The permit number is 75010. The most relevant conditions of this permit are:

1. Permittee shall install and operate the Solar Centaur in accordance with R18-2-801.1 &35 (40 CFR 60, Subpart A and GG). The GE frame 3 shall be installed and operated in accordance with R18-2-719.
2. Permittee shall not exceed the values stated on Attachment "B" entitled "Emission Sources- Maximum Allowable Emission rates."
3. If the Solar Centaur type H turbine is operated at a level such that the emissions are less than specified in subpart X.B.1, above, then the Solar Centaur Type H turbine shall comply with the emission standard specified in 40 CFR 60 subpart GG. The Solar Centaur Type H turbine shall not discharge sulfur dioxide in excess of 0.015 percent by volume at 15% oxygen and on a dry basis.
4. If the GE-2-3-R turbine is operated at a level such that the emissions are less than specified in subpart X.B.1, above, then the GE-2-3-R turbine shall comply with the provisions of A.A.C. R18-2-718.
5. Permittee shall install an hour meter on the Waukesha generator. Normal operation is limited to 25 hours per year. Report annual operating hours..

The initial performance test demonstrated that NOX emissions from the GE Frame 3 were as high as 282 tons per year. The NOx emissions from the Solar Centaur were approximately 40 tons per year. Therefore, the ADEQ issued an NOV citing that the addition of Solar Centaur turbine should have been submitted as a modification to a major source. However, this NOV was eventually closed and the Solar Centaur turbine was retrofitted to include the SoLoNox technology. Because the SoLoNox technology has not been addressed in the installation permit, a minor permit revision has been submitted and is being processed by ADEQ.

Several performance tests have been conducted and the latest tests gave the following results:

Test Date	Source	NOX (lb/hr)	CO (lb/hr)
January 21, 1997	GE Frame 3	31.3	1.57
January 22, 1997	Solar Centaur	3.07	1.13

Emissions

The Emissions reported in Attachment "B" of the the Installation Permit were based on AP-42. These caps on emissions were unessesary and were not reported to set up limitations.

The potential emissions reported in the Title V permit application were based on actual tested emissions and the Title V application and the updated minor revision request provides the following potential emission rates:

NOX: 338.12 tpy
CO: 198.04 tpy
VOC: 12.94 tpy
SO_2: 0.21 tpy
Formaldehyde: 5.03 tpy

These emission rates were based on emission factors (e.g. AP-42), theoretical stoichiometric considerations and 8760 hours of operation per year. They have also reported test data based on testing carried out in 1991- 1997. The measured hourly emission rates when multiplied with the actual hours of operation in 1993 give the following actual emissions for that year:

NOX: 80.64 tpy (test data, actual hours)
CO: 48.87 tpy (test data, actual hours)
VOC: 0.82 tpy (test data, factors, actual hours)
SO_2: 0.16 tpy (emission factors, actual hours)
Formaldehyde: 3.27 tpy (emission factors, actual hours)

The emissions inventory (EI) for the year 1994, submitted to the Arizona Department of Environmental Quality (ADEQ) reported the following emissions:

Pollutant	Actual Emissions in 1994
1994 Emissions Reported from EPNG Wenden Station	
CO	5.85
NO2	195.71
SO2	0.20
VOC	1.00
1995 Emissions Reported from EPNG Wenden Station	
CO	7.85
NO2	172.54
SO2	0.21
VOC	0.81

Permit Contents : Attachment B

The GE Frame 3 gas turbines was installed in 1969 as such is not subject to the provisions of any of the new source performance standards (NSPS). The state rule that covers gas turbine operations is *R18-2-719 : Standards of performance for existing stationary rotating machinery*. This state rule considers emissions of three pollutants (I) particulate matter, (ii) visible emissions, and (iii) sulfur dioxide. There is no reference to NOx or CO emissions.

The Solar Centaur gas turbine was installed in 1991 and is therefore subject to the provisions of new source performance standards. A NSPS for gas turbines was promulgated on 9/10/1979 and is listed as Subpart GG of 40CFR60. This subpart contains NOX and sulfur dioxide standards. However, the NOx standard has been waived by EPA.

Emission Limits/Standards

A. *GE Regenerative Gas Turbine*

Natural gas combustion results in negligible particulate matter emissions. The maximum potential particulate emissions from the gas turbines at the Wenden station were calculated to be 4.37 tpy. The emissions standard in R18-2-719.C imposes a particulate matter emissions limit of 94.6 tpy. The particulate matter standard in R18-2-719.C is an impractical guide for regulating/monitoring gas turbine operation. The operating permit requires EPNG to combust only natural gas for turbine operations. The sulfur standard in R18-2-719.F refers to low sulfur fuel

*oil*s, therefore this standard is not applicable to natural gas combustion. R18-2-719.I and R18-2-719.J require recordkeeping and reporting requirements of fuel sulfur quantity. In all probability, these requirements support the aforementioned sulfur standard, and as such are not applicable to natural gas combustion. The visible emissions standard, R18-2-719.E, imposes a 40% opacity limitation.

B. *Solar Centaur Simple Cycle Gas Turbine*

The following Nox standard must be met:

$$STD = 0.0150 * \frac{(14.4)}{Y} + F$$

where:

STD = allowable Nox emissions (percent by volume at 15 % oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's peak load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour.

F = Nox emission allowance for fuel-bound nitrogen as defined in 40 CFR 60.332.(a)(3).

Also, the standard for SO2 is that permittee shall not burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.

B. *Non-point sources*

The standards in Article 6 are applicable requirements for open areas and on-site vehicular traffic. The EPNG Wenden site is located in a remote area. EPNG sites typically have areas which are graveled, and other areas which are covered by natural vegetation. The Wenden site has minimum supervision, and as such there are hardly any continuous activities which are likely to disturb unpaved areas and cause visible emissions. There is very little vehicular activity. It is not expected that visible emissions from open areas and roads and storage piles will be of any significant concern in this situation. However, the regulations in Article 6 are generally applicable requirements and as such, have to be included in the permit.

EPNG has indicated in the application, that rare instances of open burning may occur. The condition in the permit directs EPNG to obtain a permit from ADEQ, or the local officer in charge of issuing burn permits.

C. *Other Periodic Activities*

Abrasive Blasting

EPNG has indicated in the permit application that there might be a few occasions on which abrasive blasting activities are conducted on-site. R18-2-726 and R18-2-702 (B) are applicable requirements, and as such have to be included in the permit. As in the case of non-point sources, these emissions are expected to be minimal.

Spray Painting

EPNG has indicated in the permit application that there might be a few occasions on which spray painting activities are conducted on-site. R18-2-727 and R18-2-702(B) are applicable requirements, and as such, have to be included in the permit. As in the case of non-point sources and spray painting, these emissions are expected to be minimal. R18-2-727(A) and R18-2-727(B) are included in the approved State Implementation Plan (SIP). R18-2-727(C) and R18-2-727(D) are also a part of the approved SIP. They are present in the definitions section of the SIP as R9-3-101.117. EPA approved SIP provision R9-3-527.C is not present in the amended rule. However, R9-3-527.C is an applicable requirement, and is federally enforceable till the current State SIP is approved by the EPA.

Mobile Sources

EPNG has indicated in the permit application that there might be a few occasions on which "mobile source" activities are conducted. "Mobile sources" refer to those sources covered by Article 8. R18-2-801, R18-2-802, and R18-2-804 are applicable requirements, and as such, have to be included in the permit. Emissions from these sources are expected to be minimal.

Monitoring and Recordkeeping Requirements

A. *Regenerative Gas Turbines*

As noted in a preceding discussion, natural gas combustion results in minimal particulate matter emissions. It was therefore decided that even though an emissions standard exists for particulate matter, it would be unnecessary and impractical to have a rigorous monitoring schedule for the particulate standard. For similar reasons, it was decided that a monitoring schedule for opacity would not be required. "Pipeline-quality" natural gas has to conform to standards approved by the Federal Energy Regulatory Commission (FERC). One of the FERC standards limits the sulfur content in the gas to less than 5 grains/100 scf (which is equivalent to 0.017 weight percent of sulfur). Another standard specifies that the heating value be greater than or equal to 967 Btu per cubic foot. EPNG runs the gas turbines with fuel drawn from their pipeline, and therefore it was decided that maintaining a copy of the FERC approved Tariff agreement on-site would be an adequate means of complying with the monitoring requirements for the particulate, opacity and fuel use standards.

B. *Solar Centaur Simple cycle engine:*

40 CRF 60.334.b requires that the permittee monitor sulfur content and nitrogen content of the fuel being fired in the turbine. However, the requirement to monitor the nitrogen content has been waived as per EOS Memorandum *Authority for Approval of Custom Fuel Monitoring Schedules Under NSPS Subpart GG,* August 14, 1987 of the enclosure states:

"Monitoring of fuel nitrogen content shall not be required while natural gas is the only fuel fired in the gas turbine."

C. *Non-point Sources*

As discussed in the emissions limits section, the non-point source standards have been included in the permit because of the existence of some generally applicable requirements. It would be impractical to impose any rigorous monitoring schedules for these standards, and as such, II.B.1 is a recordkeeping requirement, directing the source to keep a record of all the efforts taken towards mitigating visible emissions from open areas. Also, monitoring requirements for the generally applicable open burning rule may be satisfied by keeping all open burn permits on file.

D. *Other Periodic Activities*

Other victims of generally applicable rules are abrasive blasting, spray painting and "mobile source" activities. It was decided to prescribe minimal monitoring requirements.

Testing Requirements

A. *GE Regenerative Turbine*:

There are no emission limits or standards for NOx and CO, therefore, specifying a performance test schedule for either of these pollutants will not serve any purpose from the enforcement point of view. The GE Turbine has been tested numerous times over the past seven years. Because this turbine has no requirement for testing as per R18-2-719 and has been tested within the last 12 months, there will not be a requirement for performance testing.

B. *Solar Centaur*:

Performance tests should be conducted once in six months prior to the expiry of this permit in accordance with 40 CFR 60.8, 40 CFR 60.335 and attachment "A" of this permit.

List of Special Provisions

In their application, EPNG provided a list of special provisions that they wanted to be addressed in the permit. This list is located in Tab 1 of the application. They have been addressed in the following manner:
Maintenance and Inspection (Item 1), Emergency Shut Down Systems (Item 3), Cathodic protection system (Item 4), General Maintenance & Construction Activities (Item 6), Start-up, Shutdown & Maintenance (Item 8), Insignificant Activities (Item 9), Portable Sources (Item 12)

It was decided that each of these items qualified for classification as an insignificant activity, and as such was included in the list in Attachment "E".

Hazardous Air Pollutants (Item 2): Refer to Sections VI and X, Attachment "A".

Abrasive Blasting (Item 5): Abrasive blasting activities have an applicable requirement in the Arizona Administrative Code AAC). Also, according to the definition in AAC R18-2-101.54, for an activity to be classified as insignificant, it should not have *any* applicable requirement. Therefore, there can be no level of "insignificance" for abrasive blasting activities. All projects have to comply with the general requirements of R18-2-726 and R18-2-702(B). Refer to Attachment B, I.C.1 and II.C.1.

Spray Painting (Item 7): A similar argument as in Item 5 above provides the reason for including R18-2-726 as an applicable requirement. There can be no level of "insignificance" for painting projects subject to the generally applicable requirements of R18-2-726. Refer to I.C.2 and II.C.2.

Emissions Trading (Item 10): ADEQ has determined that EPNG should apply for a permit revision (if necessary) in case there are any changes in the permitted equipment.

Location of records (Item 11): Refer Section II.B, Attachment “B”.

Air Conditioners (Item 13): Refer to Section XXI, Attachment "A".

Asbestos (Item 14): Refer to Attachment “C”.

Performance Tests (Item 15): Refer to Section VI, Attachment "B".